in his desire and co-operative, but, in spite of great persistence on both sides, he was not cured. As there did not seem to be any constitutional abnormality, it can only be assumed that this failure was due to some defect in technique.

Analytic treatment is in itself no solution to the whole problem of homosexuality, because of the time-consuming factor. But the continued investigation of such cases is desirable, for, if the causes of homosexuality as lying in infantile experiences can be substantiated it should be possible by avoiding these experiences to prevent it. If the causes in each of the cases mentioned are studied, it is evident that they could have been prevented by different treatment at the hands of the parent. The prevention of homosexuality, like that of all the other neuroses, seems to lie in right parenthood.

Summary

The origin of homosexuality and other deviations from the normal seems to originate in very early childhood experiences. Cases are given, some relating to treatment 30 years back, and others more recent, which indicate that when these causes are discovered and the experiences revived the patient is able to adjust himself to them in a way he was unable to do as an infant, and is thereby cured. This process of cure is a long one, and cannot be considered a practical answer to the widespread incidence of homosexuality. Probably the main benefit in analysing these cases and the discovery of their causes is that we may find the means to prevent them.

APPLICATION OF ANTIBIOTICS (POLYBACTRIN) IN SURGICAL PRACTICE, USING THE AEROSOL TECHNIQUE

BY

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The occurrence of infection in elective surgical operations is a major clinical problem, varying in severity from place to place and from time to time. Most cases of this infection are due to a type of *Staphylococcus aureus* relatively resistant to penicillin, and, in recent years, increasingly resistant to the broad-spectrum antibiotics. Of the remainder, many are the result of infection by *Pseudomonas pyocyanea,* which is also resistant to most of the antibiotics in common use.

Increase in Resistant Strains

Barber and Rozwadowska-Dowzenko (1948) drew attention to the rising incidence of penicillin-resistant strains of *Staph. aureus* and reported that in a London hospital the incidence had risen from 14% in 1946 to 59% in 1948. Many similar reports have been published, and in the U.S.A. it is thought that 75–80% of staphylococcal infections in hospitals are caused by penicillin-resistant strains (Long, 1955; Spink, 1955). The high incidence is so far confined to in-patients, but there is some evidence that penicillin-resistant infections are also appearing with greater frequency among out-patients (Rees *et al.*, 1955). Persistent, hardy, and adaptable potentially pathogenic staphylococci are ubiquitous in the hospital environment and continue to produce strains resistant to the antibiotics most often used in clinical practice.

Many factors and circumstances are responsible for surgical sepsis. Busy operating theatres in use throughout the 24 hours, defective or outdated theatre and dressing-room ventilation systems, nasal carriers of resistant bacterial strains commonly found amongst hospital staff, unreliable methods of skin decontamination, the use of local vasoconstrictor solutions (adrenaline) for infiltration of the wound area, breaches of surgical technique; all these, in different places and in different circumstances of varying importance, may combine or permutate to increase the risk and incidence of surgical infection. In the last analysis, however, surgical infection is caused by the implantation of pathogenic organisms by aerial contamination, droplet spread, or direct surgical implantation into the exposed wound at the time of operation. While, obviously, the attack on sepsis in any particular surgical organization may be on one or all of the fronts mentioned above, the problem may not be soluble by attention to them.

One method of tackling the problem is by the use of topical antibiotics, to destroy or combat the pathogens as they are or may be, implanted in the wound at operation.

While "asepsis" in the strict etymological sense is an unattainable ideal, the practical aim must be the minimal bacterial contamination of a "clean" surgical wound.

It is probable that local conditions adverse to combating infections (dead tissue, adrenaline ischaemia, operating-time, foreign-body implants) are reasonably constant factors when considered in relation to a series of 250 neurosurgical operations such as are reported below. The dosage of contaminating pathogens is the variable and decisive factor. Unless this contamination can be controlled in some way, the case for a topical antibiotic is rendered mandatory. If the desirability of such a topical preparation is granted, it is important that the chosen preparation should neither sensitize patients nor favour the emergence of resistant strains.

For such a topical preparation a number of known antibiotics, too toxic for systemic use but with a wide range of effectiveness of action and negligible tendency to increase resistance, may be considered. Polymyxin, bacitracin, and neomycin, which are poorly absorbed into the body from "raw" tissue surface, have recently been prepared as an antibiotic triad ("polybactrin") for local use. The application of this combination requires special consideration on account of its relative insolubility and instability in aqueous solutions.

These difficulties have been overcome by suspending an intimate mixture of the antibiotics in an inert, highly volatile anhydrous liquid, "dichloro-tetrafluoro-ethane." The preparation is contained under pressure in a receptacle which permits "pushbutton" discharge of the antibiotic mixture as an aerosol. By this means the antibiotics can be dispersed evenly on any desired wound site. The high concentration and high bactericidal activity of the triad limits the risk of resistant strains emerging.

This antibiotic triad has recently been used in a clinical trial for the prophylaxis of surgical sepsis at the Department of Surgical Neurology in the Royal Infirmary of Edinburgh. The price paid for sepsis in Neurological Surgery, in terms of mortality, morbidity, and bed utilization, may be great, and any practical steps to limit or minimize its incidence are valuable.

Method

The antibiotic is released from its container by pressure on the releasing valve at its top. From a distance of 8–10 in. (20-25 cm.) the projected antibiotic triad is directed into the wound, care being taken to ensure even distribution. In this trial the wound was sprayed at each wound layer encountered on opening and closing. For example, during craniotomy the under surface of the scalp and the exposed pericranium were sprayed after reflection of the scalp flap; the bone flap, with its attached muscle, and the dura were sprayed when the bone flap had been elevated. On closure the order was reversed: firstly the dura, then the bone flap and muscle, next the pericranium and under surface of the scalp, and finally the wound edges, were treated after their approximation by deep galeal sutures.

In the case of spinal operations the deep fascia and muscle were sprayed during the opening, and the muscle, deep fascia, and skin edges during their closure.

Results

The technique outlined above has been used on 250 consecutive surgical cases over a period of approximately five months. The analysis of these cases is as follow :

Craniotomy with bone flap			52
Craniectomy	of posterior fossa	19	34
	of subtemporal region	11	
	others	4	
Prolapsed intervertebral disk (by fenestration operation, including a few reopenings for recurrent protrusion or protrusion at different levels)			73
Laminectomy (for spinal tumour, rhizotomy, etc.)			23
Neck operations (cervical sympathectomy, carotid ligation, etc.)			16
Multiple exploratory burr-holes			25
Hydrocephalus operations: ventriculo-jugular, ventriculo-peritoneal, and theco-peritoneal tube implantation operations			14
Burr-holes with ventricular drainage			5
Cranioplasty	Autogenous bone flap		5
	Prosthesis		2
Spinal bone graft			1

Incidence of Sepsis.—In this series of 250 cases septic complications were encountered in three cases. In only one instance was it of major importance, and this was in a case of cranioplasty where there were predisposing factors to the development of infection. The patient was a young man who had suffered a severe head injury with compound depressed fracture two years previously. Two attempts at cranioplasty following his injury had been made, and both failed because of sepsis. On this occasion tantalum repair was attempted, but again the prosthesis had to be removed on account of wound infection. The two remaining cases were examples of minor sepsis—a small stitch abscess in a subtemporal decompression wound and a superficial infection in a neck wound of a baby on whom a ventriculo-jugular shunt operation had been performed for hydrocephalus. The onset of sepsis in this latter case was preceded by mechanical wound disruption due to cerebrospinal fluid collection and there was also present in the wound a foreign body—the shunt tube of portex rubber.

Control Series

Analysis of several series, similar in number and range of cases, operated on at earlier periods in the same department under identical conditions but without the use of the local antibiotics, all showed a fairly constant incidence of sepsis. The 250 consecutive surgical operations immediately before the present investigation into the efficacy of polybactrin are reported below :

Craniotomy with bone flap			49
Craniectomy	of posterior fossa	18	33
	of subtemporal region	12	
	others	3	
Prolapsed intervertebral disk (fenestration operation with a few reopenings)			87
Laminectomy (for spinal tumour, rhizotomy, etc.)			28
Neck operation (cervical sympathectomy, carotid ligations)			20
Multiple exploratory burr-holes			12
Burr-holes with ventricular drainage			3
Hydrocephalus operations: ventriculo-jugular, ventriculo-peritoneal, and theco-peritoneal tube implantation operations			10
Cranioplasty	Tantalum prosthesis	3	5
	Autogenous bone	1	
	Acrylic prosthesis	1	
Others			3

The incidence of major sepsis in this control series affected 18 cases (7.2%). Five were cases of craniotomy with bone flap, and the management of their infective complication required wound reopening and removal of the bone flap. Six cases were spinal operations for prolapsed intervertebral disk, and their infections required reopening of the wounds, drainage, and secondary suture. In addition, six craniectomy wounds were infected. The remaining infection occurred in a young man in whom cranioplasty had been carried out using an autogenous bone flap, and the graft had to be removed.

There were three cases of minor sepsis (stitch abscesses), which responded to simple measures of local treatment.

The organisms responsible for the infections in this series were for the most part *Staph. aureus* of the penicillin-resistant type ; one case (craniotomy with bone flap) was the result of gas-gangrene infection and two of the infected spinal wounds were caused by *Ps. pyocyanea.*

It should be added that the incidence of infection quoted in this control series (immediately preceding the test series), though sufficiently distressing, did not represent a particularly black period. While the surgical infection rate has varied, the series quoted is approximately average for the past two years. This incidence of infection persisted despite continual efforts by experienced surgeons to control it by other known means—for example, renovation of ventilation systems, revision of skin preparation technique, the checking of sterilizer efficiency, etc.

Possibly the incidence is connected with the crowded conditions of the department in question, the proximity of operating theatre suite to ward accommodation, etc. Be this as it may, the introduction of the polybactrin aerosol technique has abruptly and convincingly reduced the incidence of surgical infections.

No systemic toxic effects, no delay in wound healing, and no local toxic effects upon the brain, spinal cord, or nerves have been observed. As it was not possible to avoid surgically important infection in 7.2% of elective operations by all other known precautions, it is proposed to continue the employment of polybactrin aerosol technique in the department in question.

Summary

The use of the antibiotic triad polymyxin, neomycin, and bacitracin (polybactrin) applied locally to wound surfaces in the prophylaxis of surgical sepsis is described.

The preparation of the antibiotic and the technique for its proper application are discussed.

A clinical trial is reported in which this technique was applied in 250 consecutive neurosurgical operations. It is contrasted with a comparable series in which this antibiotic technique was not used.

The analysis showed a reduction in the incidence of major sepsis from 7.2% to 0.4% and in minor sepsis from 1.2% to 0.8%.

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The National Birthday Trust Fund last week gave a first showing of the second in the series of films which began with "My First Baby." The new film, entitled "Toxaemia of Pregnancy," was sponsored by Pfizer Ltd. and produced by Dr. and Mrs. W. A. Bullen, with the obstetric advice of Miss J. R. C. Burton-Brown. It gives a simple account of toxaemia, and advice on the way to lead a healthy life during pregnancy. Introducing the film, Professor R. J. KELLAR spoke of the value of what he called "briefing classes" in antenatal clinics. Absence of instruction increased fears in young pregnant women, who were happier and braver if they were given instruction. So far as toxaemia of pregnancy was concerned, it was essential to pay very great attention to the minor symptoms of the disease. After the film had been shown there was a lively discussion under the chairmanship of Professor J. C. McClure Browne. Mr. ARNOLD WALKER described the film as excellent "in accentuating points that matter in eliminating toxaemia."